



Consists of 20 C1 & C2 questions.

10 questions from Chapter 1 and another 10 questions from Chapter 2.

1. Two naturally occurring isotopes of iridium are ^{191}Ir and ^{193}Ir in the ratio of 5:8 respectively. Calculate the relative atomic mass of iridium.

- A. 129
- B. 119
- C. 219
- D. 192

2. The atomic masses of ^{47}Ti and ^{48}Ti are 47.0051u and 48.0560u respectively. Calculate the relative abundance of ^{48}Ti , if the average atomic mass of Ti is 47.8864u.

- A. 0.7868
- B. 0.2132
- C. 0.8386
- D. 0.1614

3. A 1.375 g sample of mannitol, a sugar found in seaweed, is burned completely in oxygen to give 1.993 g of carbon dioxide and 0.9519 g of water. The empirical formula of mannitol is?

- A. CHO
- B. CH_8O_3
- C. $\text{C}_3\text{H}_2\text{O}$
- D. $\text{C}_3\text{H}_7\text{O}_3$

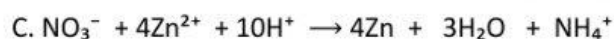
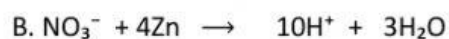
4. A concentrated phosphoric acid solution contains 85% by mass of H_3PO_4 . Calculate the molality of the phosphoric acid.

- A. 58.7 m
- B. 57.8 m
- C. 75.8 m
- D. 65.7 m

5. What is the molarity of $\text{Cr}_2\text{O}_7^{2-}$ solution prepared by dissolving 2.78g $\text{Na}_2\text{Cr}_2\text{O}_7$ in distilled water and the final volume of the solution is 500 mL?

- A. 0.20 M
- B. 0.037 M
- C. 0.021 M
- D. 0.370 M

6. Solve the following redox reaction that occurs in acidic condition.



7. The reaction between acetic acid, CH_3COOH and 17.13 g of Barium hydroxide, $\text{Ba}(\text{OH})_2$ produces a salt. If the reaction produced 22.40g of salt, determine the percentage yield of this reaction.

A. 87.74%

B. 114.11%

C. 43.86%

D. 57.05%

8. 128g KBr is dissolved in 925g of water. What is the molality of the KBr solution?

A. 0.021 m

B. 0.21 m

C. 1.162 m

D. 0.016 m

9. The empirical formula of a compound of uranium and fluorine that is composed of 67.6% uranium and 32.4% fluorine is (Ar U = 238.0 gmol⁻¹, Ar F = 19.0 gmol⁻¹)

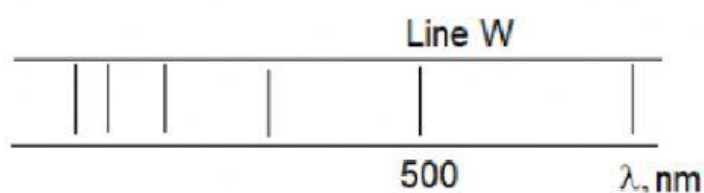
- A. U₂F
- B. U₃F₄
- C. UF₄
- D. UF₆

10. 12.88 g of a metal oxide, M₂O₃ reacts with excess hydrogen gas to produce metal M and 4.35 g of water. What is the relative atomic mass of atom M.



- A. 55.90
- B. 65.40
- C. 63.60
- D. 159.80

11. The following figure shows lines in visible region of a spectrum of hydrogen atom. Which of the following is the transition of electron between levels of energy that gives rise to line W?



- A. n₂ to n₁
- B. n₃ to n₂
- C. n₂ to n₃
- D. n₄ to n₂

12. The difference in energy between the second and third energy levels of a hydrogen atom is 3.03×10^{-19} J. What is the wavelength of the photon emitted. When transition occurs between these two energy levels?

A. 456 nm

B. 656 nm

C. 832 nm

D. 230 nm

13. What is the energy, in Jmol^{-1} , of one mole of photons emitted with a frequency of 6.336×10^{15} Hz?

A. $4.20 \times 10^{-18} \text{Jmol}^{-1}$

B. $3.96 \times 10^{-17} \text{Jmol}^{-1}$

C. $2.53 \times 10^6 \text{Jmol}^{-1}$

D. $3.88 \times 10^{14} \text{Jmol}^{-1}$

14. The fourth line of Balmer series has a wavelength of 410nm. What is the frequency?

A. $1.23 \times 10^2 \text{s}^{-1}$

B. $6.32 \times 10^{14} \text{s}^{-1}$

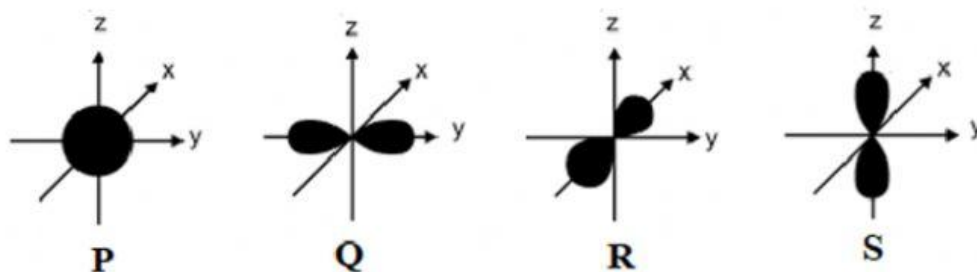
C. $1.37 \times 10^{15} \text{s}^{-1}$

D. $7.32 \times 10^{14} \text{s}^{-1}$

15. Which of the following sets of quantum numbers describe the electron in 3d orbital.

- A. $n = 3$ $l = 2$ $m = 0$ $s = +1$
- B. $n = 3$ $l = 2$ $m = 0$ $s = +1/2$
- C. $n = 3$ $l = 2$ $m = -3$ $s = -1/2$
- D. $n = 3$ $l = 1$ $m = 2$ $s = +1/2$

16. The figure shows the orbitals of the highest energy electrons located at the third shell of Y element. Orbital P and Q are fully filled, while R and S are half filled. Determine the proton number of Y element.



- A. 6
- B. 14
- C. 16
- D. 18

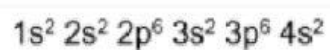
17. The set of quantum numbers for three electrons with the highest energy of an atom A are shown below. What is the electronic configuration of ion A if three electron were removed from atom A?

$$n=3 \quad l=2 \quad m=-1 \quad s=-1/2$$

$$n=3 \quad l=2 \quad m=0 \quad s=-1/2$$

$$n=3 \quad l=2 \quad m=-2 \quad s=-1/2$$

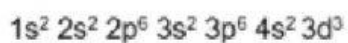
A.



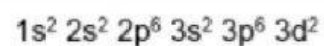
B.



C.

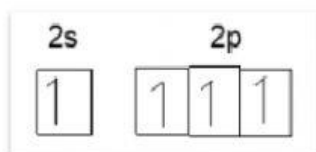


D.

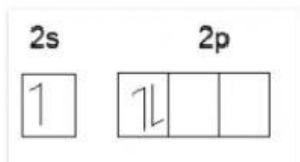


18. Which of the following orbital diagrams describe Hund's rule?

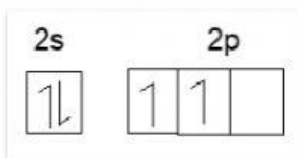
A.



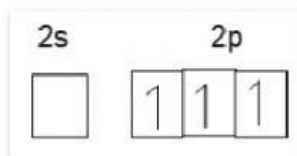
B.



C.



D.



19. The electronic configuration of copper atom is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$. Determine the number of electron in the copper atom in the group state with magnetic quantum number, $m=0$.

A. 7

B. 13

C. 10

D. 12

20. The anomaly in electronic configuration of Copper-29 is an example of disobeying the rule/principle of:

- A. The Pauli's exclusion principle
- B. The Aufbau's principle
- C. The Heisenberg's uncertainty principle
- D. Hund's rule